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Room Temperature Ferromagnetism in GaN-AlN Quantum Confined Heterostructures[1] T.F. KENT, J. YANG, L. YANG, S.D. CARNEVALE, B. NILES, Department of Materials Science and Engineering, The Ohio State University, D.R. HOY, Y.-H. CHIU, E. JOHNSTON-HALPERIN, Department of Physics, The Ohio State University, M.J. MILLS, R.C. MYERS, Department of Materials Science and Engineering, The Ohio State University — GaN and AlN two dimensional electron gas heterostructures were grown by plasma assisted molecular beam epitaxy. During growth, a δ-doped layer of Gd was introduced at a controlled distance from the interface of the GaN and AlN layers. Resulting magnetic and structural properties were characterized by a variety of complementary methods including X-ray diffractometry, atomic force microscopy, transmission electron microscopy, superconducting quantum interference device magnetometry, photoluminescence spectroscopy and measurement of the anomalous Hall effect. Doping with Gd was observed to give rise to a colossal magnetic moment of $200\mu_B$/Gd with a Curie point in excess of 300K. To elucidate the mechanism by which introduction of Gd results in such a large moment, a wide variety of heterostructure geometries and growth conditions have been explored.

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